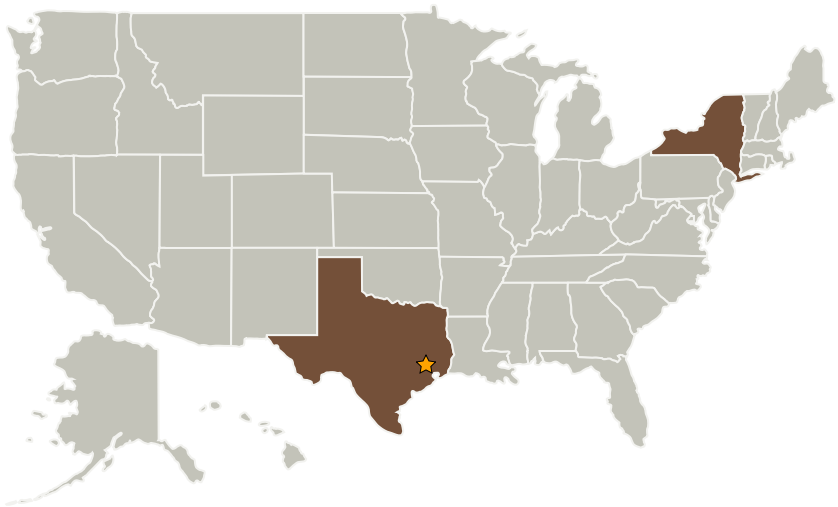
Dust-Tolerant Reusable Connection Mechanisms for Lunar Environments, Phase I

Completed Technology Project (2006 - 2006)

Project Introduction

Dust, especially lunar dust, has been identified as a significant and present challenge in future exploration missions. In addition to posing contamination and health risks for human explorers, the interlocking, angular nature of lunar dust and its broad grain size distribution make it particularly detrimental to mechanisms with which it may come into contact. All Apollo lunar missions experienced some degree of equipment failure due to dust, and it appears that dust accumulation on exposed material is unavoidable and difficult to reverse. However, experience also indicates that material selection, location, and crew action can mitigate the detrimental effects of dust. It remains the case that significant development is called for in the area of devices and structures that tolerate or mitigate the presence of lunar dust. Thus, Honeybee Robotics proposes to develop both active and passive methods for tolerating and mitigating dust accumulation on reusable connection mechanism interfaces. Techniques such as baffles, brushes, and fluid-washing will be explored more thoroughly as they relate to mechanical connections. Dust-tolerant connection strategies will be an enabling step for much of the technology that Honeybee is currently developing for lunar drilling and sample and instrument manipulation in particular, and as a necessary precursor to interfaces for transferring electricity, fluids, and other utilities in general.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Honeybee Robotics, Ltd.	Supporting Organization	Industry	Pasadena, California

Primary U.S. Work Locations	
New York	Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX07 Exploration Destination Systems
  - TX07.2 Mission Infrastructure, Sustainability, and Supportability
    - TX07.2.5 Particulate Contamination Prevention and Mitigation